

## ABSTRACT

A speed of a motor is estimated by determining a correlation between a current wave sensed at the motor and frequency pairs from a set of weighted frequency pairs  
5 representing the current wave. Components of a motor control signal are fit to a corresponding number of first orthogonal pairs in a set of weighted orthogonal pairs. The orthogonal pairs being orthogonal to the frequency pairs. Each of the frequency  
pairs are fit as the orthogonal pair subsequent to the first orthogonal pairs. The frequency pairs that provide a reduction in the mean squared error between the current  
10 wave and the set of weighted orthogonal pairs that satisfies a criteria are identified. Desired frequencies from the identified frequency pairs are then compared with a motor speed harmonic model to determine an estimation of the speed.